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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/807,220	03/22/2004	Sabina J. Houle	884.C30US2	3305
7590	11/02/2004		EXAMINER HUYNH, ANDY	
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A. P.O. Box 2938 Minneapolis, MN 55402			ART UNIT 2818	PAPER NUMBER

DATE MAILED: 11/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/807,220

Applicant(s)

HOULE ET AL.

Examiner

Andy Huynh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 October 2004.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 7-11 and 26-41 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 7-11 and 26-41 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 22 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 06/25/04.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

In the Amendment dated October 04, 2004, the specification is amended, claims **1-6 and 12-25** are canceled, claims **7-9 and 11** are amended, and new claims **26-41** are added and are acknowledged. Accordingly, claims **7-11 and 26-41** are currently pending in this application.

Information Disclosure Statement

This office acknowledges receipt of the following items from the applicant: Information Disclosure Statement (IDS) filed June 25, 2004. The references cited on the PTOL 1449 form have been considered.

Claim Rejections - 35 U.S.C. § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims **7, 9, 27, 28, 32-34 and 36-39** are rejected under 35 U.S.C. 102(b) as being anticipated by Hiroyuki (JP: 59188944), Applicant's submitted prior art (ASPA).

Regarding claim 7, Hiroyuki discloses in Fig. 2 and the corresponding texts as set forth in English Abstract, a method of forming a heat spreader comprises:

forming a mass of material into a body/a cover (11) approximately rectangular in shape having a top surface, a bottom surface and at least one corner ; and

forming at least three downset legs on the mass of material/the cover, wherein the at least three downset legs are formed to be downset from the bottom surface and wherein the at least three downset legs and the bottom surface define a cavity.

Regarding claims **9 and 27**, Hiroyuki discloses in Fig. 2 wherein the method further comprises forming at least one notch on the mass of material, wherein the notch is formed in the vicinity of the corner; forming at least one notch formed between the top surface and the bottom surface proximate to the at least one corner.

Regarding claim **28**, Hiroyuki discloses in Fig. 2 and the corresponding texts as set forth in English Abstract, a method of forming a heat spreader comprises:

forming a body/a cover (11) having a top surface, a bottom surface, at least one side and at least one corner;

forming at least three downset legs formed to be downset from the body bottom surface by a distance wherein the at least three downset legs and the body bottom surface define a cavity between the legs.

Regarding claim **29**, Hiroyuki discloses in Fig. 2 the method wherein forming the body includes forming the body with four downset legs formed thereon, and wherein each downset leg is formed proximate to a separate corner of the heat spreader body/the cover.

Regarding claims **32 and 33**, Hiroyuki discloses in Fig. 2 the method wherein the body and at least one downset leg are comprised of thermally conductive material; and the method wherein the cavity is configured to receive at least one microelectronic die (12).

Regarding claim **34**, Hiroyuki discloses in Fig. 2 the method wherein forming the body includes forming the body in a rectangular shape.

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Regarding claim 36, Hiroyuki discloses in Fig. 2 and the corresponding texts as set forth in English Abstract, a method of forming a heat spreader comprises:

forming a body/a cover (11) having a top surface, a bottom surface, a periphery and at least one side in a shape having a plurality of corners;

forming a plurality of legs extending down from the bottom surface on the periphery of the body and thereby forming a semiconductor die cavity under the bottom surface of the body, the plurality of legs being attached to a non-contiguous lip around the body; and

forming a notch between the top surface and the bottom surface in proximity to the at least one corner.

Regarding claims 37-39, Hiroyuki discloses in Fig. 2 the method further includes attaching a microelectronic die (12) to the bottom surface of the bottom surface within the cavity; wherein forming a plurality of legs includes forming each of the plurality of legs in a corresponding one of the plurality of corners; and the method further includes forming a mechanical attachment mechanism in each of the plurality of corners.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hiroyuki (JP: 59188944), Applicant's submitted prior art (ASPA) in view of the specification of the invention.

Hiroyuki discloses the claimed limitations except for the method wherein the forming a mass of material comprises at least one cold forming process. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use at least one cold forming process to form a mass of material since it was well known in the art as set forth in the specification, page 7, lines 19-23.

Claims **10 and 30** are rejected under 35 U.S.C. 103(a) as being unpatentable by Hiroyuki (JP: 59188944) in view of Domadia et al. (USP: 5,949,137 hereinafter referred to as "Domadia").

Hiroyuki discloses the claimed limitations except for the method wherein at least one void is formed on the at least one downset leg, wherein the void is configured to receive at least one mechanical attachment device. Domadia teaches in Fig. 2 the mounting holes (26) formed at the corners (28) of the heat spreader (15) of the flip chip packaging assembly. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to form the mounting holes at the corners of the heat spreader, as taught by Domadia to modify and incorporate into Hiroyuki's structure to form the claimed invention in order for receipt of mounting posts of the packaging assembly (see Domadia, column 2, lines 39-42).

Claims **11, 26 and 31** are rejected under 35 U.S.C. 103(a) as being unpatentable by Hiroyuki (JP: 59188944) in view of Tarter et al. (USP: 6,512,675, hereinafter "Tarter").

Regarding claim **11**, Hiroyuki discloses the claimed limitations except for the method wherein the at least one downset leg is formed to be configured to receive at least one clamp. Tarter teaches in Fig. 2 the heat sink-package assembly (100) comprising the clips (118), each of

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the clips (118) is snapped over the flanges (114) and (116). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to utilize Tarter's teaching of the clip using in the heat sink-package assembly to modify and incorporate into Hiroyuki's structure to form the claimed invention in order to provide sufficient strength to hold the heat sink to the package lid/the heat spreader (see Tarter, column 3, lines 29-30).

Regarding claims **26 and 31**, Hiroyuki discloses the claimed limitations except for the method wherein the at least one downset leg is configured to receive at least one clip. Tarter teaches in Fig. 2 the heat sink-package assembly (100) comprising the clips (118), each of the clips (118) is snapped over the flanges (114) and (116). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to utilize Tarter's teaching of the clip using in the heat sink-package assembly to incorporate into Hiroyuki's structure to form the claimed invention in order to provide sufficient strength to hold the heat sink to the package lid/the heat spreader (see Tarter, column 3, lines 29-30).

Claim **35** is rejected under 35 U.S.C. 103(a) as being unpatentable by Hiroyuki (JP: 59188944).

Hiroyuki discloses the claimed limitations except for the method wherein forming the body includes forming the body in an octagon shape. It would have been an obvious to one having ordinary skill in the art at the time of the invention was made to choose the body in any shape, since applicant has not disclosed that the body being octagonal in shape solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with different shapes instead.

Claims **40 and 41** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiroyuki (JP: 59188944) in view of Zuo et al. (USP: 6,525,420 hereinafter referred to as "Zuo").

Regarding claim **40**, Hiroyuki discloses the claimed limitations except for the method further includes forming a notch in the top surface of the body in each of the plurality of corners. Zuo teaches in Figs. 3 and 4 a lid heat spreader (20) comprises a notch/flange (25) formed in the top surface of the corner of the lid heat spreader.

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to form a lid heat spreader comprising a notch/flange formed in the top surface of the corner of the lid heat spreader, as taught by Zuo, to incorporate into Hiroyuki's structure to form the claimed invention in order to support the lid heat spreader above the substrate and semiconductor device (see Zou, column 4, lines 30-32).

Regarding claim **41**, Hiroyuki discloses in Fig. 2 the method wherein the top surface is approximately rectangular in shape.

Conclusion

Applicants' amendment necessitated the new ground(s) of rejection presented in this Office Action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicants are reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andy Huynh whose telephone number is (703) 305-0089. The examiner can normally be reached on Monday-Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (703) 308-4910. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

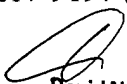
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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10/30/04



David Nelms
Supervisory Patent Examiner
Technology Center 2800